

Sputum for Cytologic Examination

A Simple Method for Obtaining Specimens from Respiratory Passages

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SPUTUM CYTOLOGY is becoming increasingly important as a tool in the early diagnosis of lung cancer, but in order to obtain reliable cytological results a specimen raised by a deep cough is necessary. Since many patients are unable spontaneously to cough up the kind that is needed, several methods to induce the raising of a suitable specimen have been developed. These include the saline-propylene glycol technique of Bickerman,² the sulfur dioxide technique,¹ and a variety of other inhalation procedures.⁴

The results of the examination of induced sputum specimens compare favorably with those of good spontaneously produced specimens, and it appears that any method which induces the production of an adequate amount of sputum from the lower

respiratory passages can be applied successfully.³ Therefore, a method requiring only simple, easily available equipment offers advantages for use in a physician's office and in smaller laboratories.

The equipment used by us for aerosol induction of sputum consists of a Croupaire®* room humidifier which is fitted with a conical aluminum foil mouthpiece. The mouthpiece is easily made by forming a cone from double aluminum foil (18 inches wide) and fastening the large end over the vapor outlet with a rubber band. The screws holding the bottom of the humidifier are permanently removed so that the bottom can be separated for cleaning. The angle of the mouthpiece can be adjusted to the patient's height by simply bending the foil cone. (See Figure 1.) While the production of

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*Croupaire model No. 66, Air-Shields, Inc., Harboro, Pennsylvania. This machine has no glass parts to break, no fine nozzles to clog, no parts to sterilize, no heating elements. It is simple to use, can be set up quickly and is easy to clean.

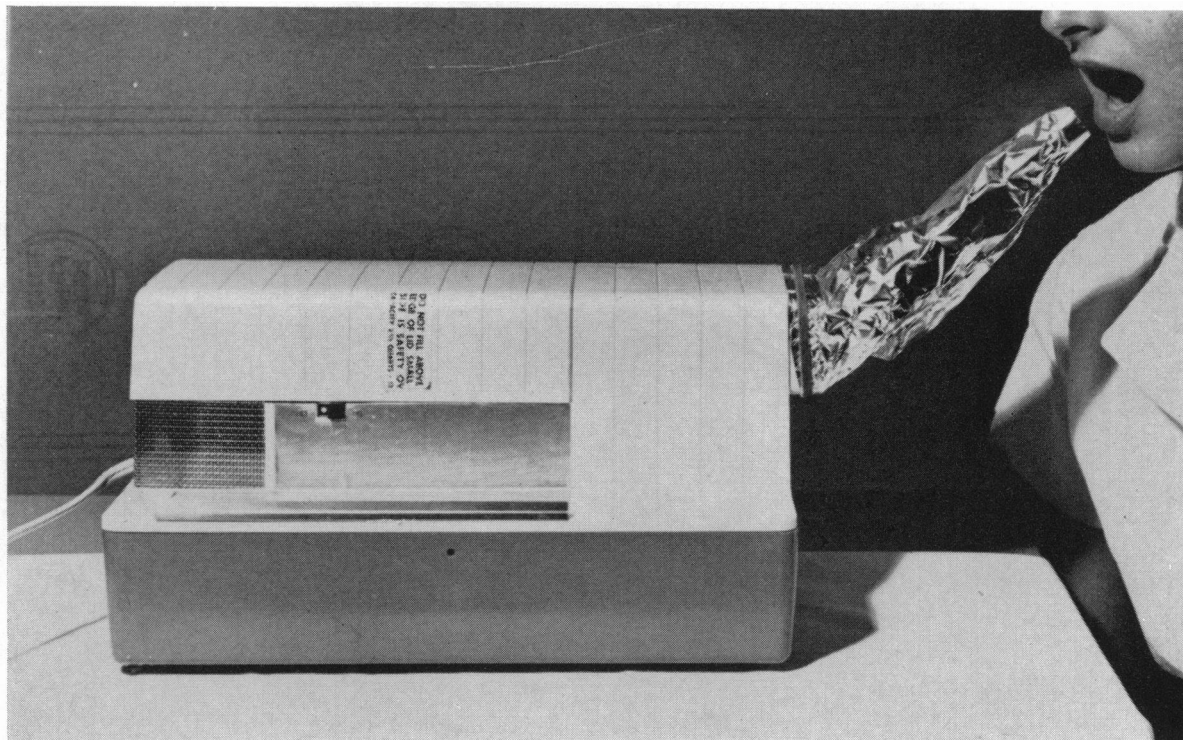


Figure 1.—Croupaire® humidifier, fitted with mouthpiece made of aluminum foil, as used for inspiration of aerosol to induce raising of sputum suitable for cytologic examination.

sputum of the kind needed can be induced without it, the mouthpiece prevents contamination of the inner parts of the humidifier, and it is disposable. Periodic cultures of the humidifier have not grown pathogenic organisms.

The solution used in the humidifier is that recommended by Bickerman: 15 per cent saline solution and 20 per cent propylene glycol, mixed well in equal amounts. While the solution is not heated as it is in most commercially available nebulizers, the vapor produced was observed to cause good cough reflexes in all patients and in asymptomatic persons on whom it was used, and no persisting evidence of bronchial irritation or other side effects were noted.

With the cone 3 to 5 inches from his open mouth, the patient breathes the aerosol, continuing until cough is evoked—not more than 15 and usually in less than 5 minutes. As a precaution, only half the concentration of saline as well as of glycol is used

in patients with emphysema or other severe respiratory disease.

The specimens obtained following inspiration of this material were of good quality, with many histiocytes and respiratory epithelial cells being observed on microscopic examination. Most of the patients had been unable to produce a suitable specimen of sputum spontaneously.

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REFERENCES

1. Allan, W. B., Whittlesey, P., and Haroutunian, L. M.: Use of sulfur dioxide as a diagnostic aid in pulmonary cancer: Preliminary report, *Cancer*, 11:938, 1958.
2. Bickerman, H. A., Sproul, E. E., and Barach, A. L.: An aerosol method of producing bronchial secretions in human subjects: a clinical technic for the detection of lung cancer, *Dis. Chest*, 33:347-362, 1958.
3. Fontana, R. S., Carr, D. T., Woolner, L. B., and Miller, F. K.: An evaluation of methods of inducing sputum production in patients with suspected cancer of the lung, *Proc. Mayo Clinic*, 37:113-121, 1962.
4. Koss, L. G.: *Diagnostic Cytology*, J. B. Lippincott Co., Philadelphia, 1961.

